

What is claimed is:

1. A fluid transfer system for use in offshore hydrocarbon producing operations, comprising:

a hybrid riser tower extending upwardly from the sea floor to a location substantially below the wave zone of the body of water;

a variable buoyancy device, to which the upper end of said hybrid riser tower is attached, capable of maintaining said hybrid riser tower in a substantially vertical orientation;

one or more steel catenary risers extending upwardly from the sea floor and attached at their upper ends to said variable buoyancy device; and

one or more flexible pipe jumpers extending from said variable buoyancy device to a surface production facility so as to allow fluid communication between said steel catenary riser terminating at said variable buoyancy device and the surface production facility.

2. The fluid transfer system of claim 1, wherein said surface production facility comprises a floating production facility.

3. The fluid transfer system of claim 1, further comprising mid-depth transfer lines extending from said variable buoyancy device to another surface production facility.

4. The fluid transfer system of claim 1, further comprising mid-depth transfer lines extending from said variable buoyancy device to an offloading buoy.

5. The fluid transfer system of claim 1, wherein said hybrid riser tower includes one or more production risers; one or more umbilicals, a carrier pipe structural member and one or more injection risers.

6. The fluid transfer system of claim 5, wherein said carrier pipe structural member is designed to have sufficient tensile strength to withstand the full buoyancy force of said variable buoyancy device.

7. The fluid transfer system of claim 5, wherein said carrier pipe structural member is designed to have a sufficient tensile strength to withstand a portion of the full buoyancy force of said variable buoyancy device.
8. The fluid transfer system of claim 1, wherein multiple hybrid riser towers are attached to said variable buoyancy device.
9. The fluid transfer system of claim 1, wherein said variable buoyancy device has means for varying the buoyancy of said variable buoyancy device.
10. The fluid transfer system of claim 9, wherein said means for varying the buoyancy of said device comprises compartmentalization of said device such that each compartment can be separately flooded and blown out.
11. The fluid transfer system of claim 1, wherein said steel catenary risers extend from said variable buoyancy device to remote production and processing facilities.
12. The fluid transfer system of claim 1, wherein hydrocarbon fluids from one or more subsea wells are transported from the sea floor to said floating production vessel through at least one hybrid riser tower and at least one flexible pipe jumper.
13. The fluid transfer system of claim 1, wherein hydrocarbon fluids are exported from said surface production facility through at least one flexible pipe jumper and at least one steel catenary riser.
14. A process for transferring fluids in offshore hydrocarbon producing operations, comprising the steps of:
  - installation of a hybrid riser tower, including attaching a variable buoyancy device to the upper end of said hybrid riser tower, where the buoyancy of said variable buoyancy device is first reduced so that its net buoyancy does not exceed the design tension limit of the hybrid riser tower;
  - installation of one or more steel catenary risers extending upwardly from the sea floor and attached at their upper ends to said variable buoyancy device, where the buoyancy of said variable buoyancy device is increased in order to support said steel

catenary risers, while keeping the net buoyancy below the design tension limit of the hybrid riser tower;

attaching the lower ends of a plurality of flexible pipe jumpers to said variable buoyancy device and the upper ends to a surface production facility in such a manner as to allow fluid flow between said risers and said surface production facility.

15. The process of claim 14, further comprising installing mid-depth transfer lines to the variable buoyancy device such as to enable fluid communication to an offloading buoy.

16. The process of claim 14, further comprising installing mid-depth transfer lines to the variable buoyancy device such as to enable fluid communication to an additional surface production facility.

17. The process of claim 14, further comprising installing an additional hybrid riser tower to said variable buoyancy device.

18. The process of claim 14, wherein said variable buoyancy device is compartmentalized such that each compartment can be flooded or blown out independently of the others.

19. The process of claim 14, further comprising installing steel catenary risers from said variable buoyancy device to remote production and processing facilities, such as to enable exportation of fluids to said remote production and processing facilities.